

REMARKS

Applicants filed on 28 October 2004 a Response to Final Office Action. In response thereto, an Advisory Action was mailed on 19 November 2004 which denied entry of the amendments proposed in the Response to Final Office Action. Applicants hereby respectfully request entry of the amendments and
5 consideration of the remarks made in the previously-filed Response to Final Office Action, a copy of which is enclosed herewith for the convenience of the Examiner, and Continued Examination.

The Examiner is invited to telephone the undersigned in regard to this Amendment and the above-identified application.

Respectfully submitted,

7-JAN-2005

Date


Laurence S. Roach
Registration No. 45,044

E-mail: LSRoach@rochester.rr.com

Laurence S. Roach, Esq.
Law Office of Thomas R. FitzGerald
16 East Main Street, Suite 210
Rochester, New York 14614-1803
Telephone : (585) 454-2250
Fax : (585) 454-6364



PATENT
90065.161701(17732.6310.003)
Response to Final Office Action of 22 Sept 2004

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

REPLY UNDER 37 CFR 1.116 - EXPEDITED PROCEDURE - EXAMINING GROUP 1746

Applicant: Schuler, et. al)
Serial No.: 10/008,623)
Filed: 06 December 2001)
For: POTTED TRANSDUCER)
ARRAY WITH MATCHING)
NETWORK IN A MULTIPLE)
PASS CONFIGURATION)

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Examiner: Markoff, A.

Art Unit: 1746

RESPONSE UNDER 37 CFR 1.116

Commissioner of Patents
MS: AF
P.O. Box 1450
Alexandria, VA 22202

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Dear Sir:

In response to the Final Office Action mailed 22 September 2004,

Applicants hereby submit the following Amendment.

IN THE CLAIMS

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1-12. (*Canceled*).

13. (*Currently Amended*) A method for megasonic cleaning of
semiconductor wafers comprising the steps of:

generating two or more parallel ~~sets of~~ megasonic waves in a cleaning
fluid, the megasonic waves having a common direction of travel ~~and wave fronts~~
5 ~~that are generally perpendicular to the direction of travel;~~

immersing ~~semiconductors~~ the wafers in the cleaning fluid; and

moving the wafers in the cleaning fluid through two or more of said
megasonic waves in a direction that is generally perpendicular to the direction of
travel of the megasonic waves and generally perpendicular to ~~the wave fronts of~~
10 a plane parallel with the megasonic waves.

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14. (*Currently Amended*) The method of claim 13 wherein the megasonic
waves are generated across parallel regions of the fluid and the step of moving
the wafers comprises reciprocating the wafers through at least two of said
parallel regions.

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15. *(Previously Presented)* A method for megasonic cleaning of semiconductor wafers disposed within a holder, the holder and wafers disposed in a cleaning fluid within a container, the method comprising the steps of:

- generating megasonic waves in the cleaning fluid;
- 5 intercepting the generated waves inside the container at a location between one or more sources of the megasonic waves and the holder, and dispersing the waves in a divergent manner; and
- exposing the semiconductor wafers to the dispersed megasonic waves within the cleaning fluid.

16-26. *(Canceled)*.

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27. *(Currently Amended)* A method for megasonic cleaning of semiconductor wafers comprising the steps of:

- generating two or more parallel sets of megasonic waves in a cleaning fluid;
- 5 immersing ~~semiconductors~~ the wafers in the cleaning fluid such that faces of the wafers are parallel with the waves; and
- moving the wafers in the cleaning fluid through said megasonic waves in a direction that is generally ~~transverse to~~ perpendicular to the megasonic waves and generally perpendicular to the faces of the wafers.

REMARKS

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Claims 13-15 and 27 are pending and rejected in the present application.

Claim 15 is amended hereby.

Claims 13-15 are rejected under 35 U.S.C. §112, first paragraph, on the
assertion that the concept of wave fronts was not supported by the original
5 disclosure. Further, the Examiner asserted that the claims were not enabled
because there was no single direction perpendicular to both the wave fronts and
the direction of travel of the waves.

Applicants are strongly of the opinion that nature provides and ensures
that each wave has a wave front, and that the knowledge that waves have wave
10 fronts is inherent in the concept of a wave. The inherency of such knowledge is
confirmed by the Examiner's inclusion in the Office Action of the material
describing and visually depicting wave fronts that was apparently readily
obtained from the Internet, for which courtesy the Examiner is thanked. The
foregoing notwithstanding, Applicant has amended claim 13 to remove therefrom
15 the term "wave front" and has thereby eliminated the basis for this ground of
rejection. Accordingly, Applicants submit that claim 13 and claims 14-15
depending therefrom are now in conformance with 35 U.S.C. §112, first
paragraph, and are thus in allowable form.

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The Examiner also objected to the Amendment filed 27 February 2004
under 35 U.S.C. §132, alleging that the concept of wave fronts and a direction of
movement perpendicular to both the direction of travel and to the wave fronts
constituted new matter. Applicants respectfully point out that, as discussed
5 above, claim 13 is amended hereby to remove therefrom the term "wave front".
Applicants submit that the rejection under 35 U.S.C. §132 has thereby been
rendered moot. Accordingly, Applicants respectfully request withdrawal of the
rejection.

Claim 15 stands rejected under 35 U.S.C. §102(b) as being anticipated by
10 any one of U.S. Patent Nos. 5,849,091 and 6,048,045 (collectively referred to
hereinafter as the Skrovan, et al., patents). More particularly, the Examiner
asserts that "it is inherent that the generated waves would be intercepted and
dispersed by part 34 and by gas bubbles 36". Responsive thereto, Applicants
respectfully traverse and submit that an improper standard of inherency has been
15 applied.

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It is well settled that a prior art reference may be relied upon in rejecting
claims under 35 U.S.C. §§102 or 103 for what that reference expressly, implicitly
and/or inherently discloses. See *In re Napier*, 55 F.3d 610, 34 USPQ2d 1782
(Fed. Cir. 1995) and *In re Grasselli*, 713 F.2d 731, 218 USPQ2d 769 (Fed. Cir.
20 1983). However, it is equally well settled that "[t]o establish inherency, the
extrinsic evidence must make clear that the missing descriptive matter is

necessarily present in the thing described in the reference. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient" to establish inherency. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (*Emphasis Added, internal quotes and citations omitted*).

The Skrovan, et al., patents teach only that the wafers are exposed to gas bubbles in the cleaning fluid. The Skrovan, et al., patents are completely devoid of any teaching or disclosure that the gas line intercepts and/or disperses the cleaning waves, nor do they disclose that the wafers are exposed to previously intercepted and dispersed cleaning waves. Further, there is no extrinsic evidence of record indicating that the gas line intercepts and/or disperses the cleaning waves, nor that the wafers are exposed to previously intercepted and dispersed cleaning waves.

As best understood by the Applicants, the Examiner has simply assumed that the gas line and/or bubbles intercept and disperse the waves. The Skrovan, et al., patents, however, contradict that assumption by disclosing that the gas line can be located on, for example, the bottom wall or any end wall of the tank. The Skrovan, et al., patents therefore disclose that the position of the gas line is not critical and that it need not be positioned to intercept and/or deflect waves. (see column 6, lines 1-9).

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The gas line is not disclosed as being of a sufficient size or dimension to intercept and disperse the cleaning waves. Thus, neither the Skrovan, et al., patents nor any extrinsic evidence makes clear that the waves are intercepted and dispersed prior to impinging upon the wafers. The mere possibility that the gas line may intercept and/or disperse the cleaning waves is not sufficient to establish inherency. As stated above, inherency may not be established by probabilities, possibilities, or by mere assumptions.

For the foregoing reasons, Applicants submit that the Skrovan, et al., patents do not disclose, inherently or otherwise, the limitations of claim 15. Further, Applicants submit that an improper standard of inherency has been applied. Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of claim 15.

Claims 13-14 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,085,764 (Kobayashi, et al.) in view of Handbook of Semiconductor Wafer Cleaning Technology (HSWCT). Applicants respectfully traverse.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Claim 13 recites in part "moving the wafers in the cleaning fluid through . . . two or more of said megasonic waves in a direction that is generally perpendicular to the direction of travel of the megasonic

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waves and generally perpendicular to a plane parallel with the megasonic waves." (*Emphasis Added*). Applicants submit that the cited references fail to disclose or suggest, alone or in combination, the limitations of claim 13 and that therefore *prima facie* case of obviousness has not been established in regard
5 thereto.

The Examiner asserts that Kobayashi, et al., discloses moving the wafers in the same direction as the present invention. Applicants respectfully point out, however, that Kobayashi, et al., discloses only that the wafers are minutely vibrated in directions that are orthogonal relative to each other. (*see column 2, lines 63-67*). Minutely vibrating the wafers in directions that are orthogonal
10 relative to, or even simply different from, each other is not equivalent to moving the wafers in a direction that is dependent upon the characteristics of the cleaning waves. Kobayashi, et al., does limit the direction in which the wafers are moved to a direction that is perpendicular to the direction of travel of the
15 waves and generally perpendicular to a plane parallel with the waves.

Kobayashi, et al., references the directions in which the wafers are moved to each other. Kobayashi, et al., does not reference the movements of the wafers to the direction of travel of the cleaning waves nor to a plane parallel with the cleaning waves, as does the present invention. Thus, Kobayashi, et al., fails
20 to disclose or suggest moving the wafers in the cleaning fluid in a direction that is generally perpendicular to the direction of travel of the megasonic waves and

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generally perpendicular to a plane parallel with the parallel waves, as recited in part by claim 13.

Further, minutely vibrating the wafers will not result in the wafers moving through two or more of the cleaning waves. Thus, Kobayashi, et al., fails to
5 disclose or suggest moving the wafers through two or more of the megasonic waves, as recited in part by claim 13.

For the foregoing reasons, Applicants submit that Kobayashi, et al., fails to disclose or suggest all the limitations of claim 13 and that therefore a *prima facie* case of obviousness has not been established in regard thereto. Accordingly,
10 Applicants respectfully request withdrawal of the rejection and submit that claim 13 and claim 14 depending therefrom are in condition for allowance, which is hereby respectfully requested.

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Claim 27 was also rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,085,764 (Kobayashi, et al.) in view of
15 Handbook of Semiconductor Wafer Cleaning Technology (HSWCT). Responsive thereto, Applicants traverse.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Claim 27 recites in part "immersing the
20 wafers in the cleaning fluid such that faces of the wafers are parallel with the waves" and "moving the wafers . . . in a direction that is generally perpendicular

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to the megasonic waves and generally perpendicular to the faces of the wafers".

(*Emphasis Added*). Applicants submit that Kobayashi, et al., fails to disclose or suggest all the limitations of claim 27, and that therefore a *prima facie* case of obviousness has not been established in regard thereto.

5 As discussed above, Kobayashi, et al., discloses only that the wafers are minutely vibrated in directions that are orthogonal relative to each other.

Kobayashi, et al., does not disclose or suggest limiting the direction in which the wafers are moved to a direction relative to the cleaning waves nor does

Kobayashi, et al., disclose limiting the direction in which the wafers are moved to
10 a direction relative to the wafer faces. Thus, Kobayashi, et al., fails to disclose or suggest orienting the faces of the wafers parallel with the waves, and moving the wafers in a direction that is perpendicular to the waves and generally
perpendicular to the faces of the wafers, as recited in part by amended claim 27.

Since Kobayashi, et al., fails to disclose or suggest all the limitations of
15 claim 27 a *prima facie* case of obviousness has not been established in regard thereto. Accordingly, Applicants respectfully request withdrawal of the rejection and submit that claim 27 is in condition for allowance and respectfully request same.

For all the foregoing reasons, Applicants submit that the pending claims
20 are definite and do particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Moreover, Applicants submit that the

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pending claims are also in condition for allowance. Accordingly, Applicants respectfully request withdrawal of all objections and rejections, and allowance of the claims.

The Examiner is invited to telephone the undersigned in regard to this

- 5 Amendment and the above identified application.

Respectfully submitted,

18-OCT-2004

Date

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Laurence S. Roach
Registration No. 45,044

E-mail: LSRoach@rochester.rr.com

Laurence S. Roach, Esq.
Law Office of Thomas R. FitzGerald
16 East Main Street, Suite 210
Rochester, New York 14614-1803
Telephone : (585) 454-2250
Fax : (585) 454-6364